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published in
Framing Land Use Dynamics II - abstractbook
2007

document version
Publisher's PDF, also known as Version of record

Paper for the special session on 'Land use and adaptation to climate change'
at the FLUD-II conference 2007 in Utrecht, the Netherlands

Localising the land-use impact of global climate change; integration of sector-specific adaptation measures with the Land Use Scanner

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Climatic changes are expected to have important implications for land-use patterns, especially in coastal areas and river basins. Land use, on the other hand, also influences the climate through its impact on, amongst others, atmospheric composition and terrestrial radiation. The complex interrelated land use/climate system is thus receiving extensive research attention around the world. In the Netherlands, the research program '*Climate changes spatial planning*' aims to develop an adequate and timely set of policies for mitigation and adaptation to cope with the impacts of climate change. This is done in a series of related research projects dealing with, for example, climate scenarios, water management and adaptations in agriculture, nature and inland navigation.

Within the research program we identify climate-change driven spatial changes in land use and land development and integrate these into balanced national visions and regional solutions. Important research questions in this respect are:

- Which possible changes are to be expected in the Dutch land-use system as a consequence of climatic changes?
- What spatial adaptation and mitigation strategies are to be developed to minimize this potential impact of climate change to the various societal sectors (agriculture, nature, residences)?
- To what extent will the proposed sector-specific adaptation and mitigation measures offer the potential for synergy or conflict at the local level?

The following methodological components are crucial in integrating the results from the other projects in the research program and therewith answering the research questions formulated above:

- a scenario framework, that consistently combines assumptions related to climate, population, economy and society, forms the common ground for the various adaptation- and mitigation measures;
- a detailed, calibrated land-use model that integrates the sector-specific adaptation measures into simulations of future land use;
- a set of indicators and visualisation applications that supports pinpointing the possible synergies and conflicts in (combinations) of land use.

This presentation focuses on the applied Land Use Scanner model and the first simulation results. The model offers an integrated view of all types of land use, dealing with urban, natural and agricultural functions. We have developed a seriously revised version of the model that offers the possibility to use a 100x100 meter grid, covering the land surface of the Netherlands in more than 3 million cells. This resolution comes close to the size of actual building blocks and allows for the use of homogenous cells that describe the single land-use type that dominates a cell. Together with the introduction of the homogenous cells a new algorithm has been developed that optimizes the allocation of land-use given the specified claims and suitability definition. The new model layout is thoroughly calibrated and validated and subsequently compared to the original modelling approach that used a 500 meter grid and heterogeneous cells.